Attachment 110

UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF WASHINGTON

FEDERAL TRADE COMMISSION,

Plaintiff,

v.

AMAZON.COM, INC., a corporation;

NEIL LINDSAY, individually and as an officer of AMAZON.COM, INC.;

RUSSELL GRANDINETTI, individually and as an officer of AMAZON.COM, INC.; and

JAMIL GHANI, individually and as an officer of AMAZON.COM, INC.,

Defendants.

Civil Action No. 2:23-cv-0932-JHC

OPENING EXPERT REPORT OF CRAIG ROSENBERG, PHD

Contents

1.0 Executive Overview and Summary of Opinions

This report addresses the Federal Trade Commission's ("FTC") allegations against Amazon.com, Inc. ("Amazon"), regarding purported deceptive practices and the use of "dark patterns" in user interface ("UI") design to drive unintended Prime memberships. The FTC claims these practices violate consumer protection laws, specifically focusing on clarity in Amazon's Prime enrollment and cancellation processes.

1.1 Key Findings and Opinions

1. **Ambiguity in "Dark Patterns" Definitions:**
    a. The term "dark patterns" lacks universally accepted standards, making its application subjective and inconsistent.
    b. Many features labeled as so-called "dark patterns" align or overlap with industry norms and usability best practices aimed at enhancing user experience or efficiency.
2. **Challenges in Measuring "Clarity":**
    a. Clarity in User Experience ("UX") design is a nuanced concept that is difficult to define or measure because it is influenced by user expectations, context, and individual perceptions.
    b. To the extent clarity is measurable, objective metrics, such as task completion rates and error rates, are essential for meaningful clarity assessments. Subjective evaluations alone are insufficient for measuring clarity.
3. **Amazon's Iterative UX Improvements:**
    a. Amazon's initiatives to enhance clarity, such as Project Lucent (2018) and other A/B testing efforts, demonstrate a commitment to data-driven UI refinement.
    b. Despite implementing clarity-focused changes, objective data (e.g., 90-day conversion rates from free trials to paid members) did not indicate meaningful improvements in user understanding or satisfaction.
4. **Objective Testing vs. Anecdotal Evidence:**
    a. Amazon's reliance on A/B testing ensures decisions are informed by empirical evidence rather than anecdotal user feedback, which can be biased or unrepresentative.
    b. The FTC's reliance on subjective assessments overlooks the diversity and complexity of Amazon's diverse user base.

5. **Alternative Explanations for User Behavior:**
    a. Declines in Prime signups following clarity-focused changes suggest factors beyond user misunderstanding, such as less persuasive marketing language or shifts in customer priorities.
    b. Some Prime cancellations result from external factors, such as fraud or deliberate misuse, rather than alleged "dark patterns."
6. **Industry Norms and Best Practices:**
    a. Amazon's UI design adheres to widely accepted industry practices, including the use of "No Thanks" links and prominence of the primary call-to-action ("CTA").
    b. Variability in user expectations and familiarity underscores the need for iterative design processes that balance clarity with user efficiency and engagement.
7. **Regulatory Challenges:**
    a. The absence of objective standards for identifying "dark patterns" complicates regulatory enforcement and risks unfairly stigmatizing legitimate business practices.

2.0 Qualifications

1. My name is Dr. Craig Rosenberg. For 30 years, I have worked in human factors,[1] user interface design, software development, software architecture, systems engineering, and modeling and simulation across a wide variety of application areas, including aerospace, communications, entertainment, manufacturing, and healthcare. For the past 21 years, I have been a consultant for Global Technica, Sunny Day Software, Stanley Associates, Techrizon, CDI Corporation, and the Barr Group. In this capacity, I have provided advanced engineering services for many companies.

2. I graduated from the University of Washington in 1988 with a B.S. in Industrial Engineering. After graduation, I continued my studies at the University of Washington, obtaining an M.S. in Human Factors in 1990. In 1994, I graduated with a Ph.D. in Human Factors. My dissertation was titled "Evaluating Alternative Controllers using the MIDI Protocol for Human-Computer Interaction." This research explored programming musical keyboards to be used as human-computer interaction devices for controlling computer workstations.

3. During my doctoral studies, I worked as an Associate Assistant Human Factors Professor at the University of Washington Industrial Engineering Department. My duties included teaching, writing research proposals, designing and conducting funded human factors experiments for the National Science Foundation, and hiring and supervising students.

4. While studying at the University of Washington, I also worked as a human factors researcher. I designed and performed advanced human factors experiments funded by the National Science Foundation, which were related to virtual environments and interface design, stereoscopic displays, and advanced visualization research. My duties included user interface design, systems design, software development, graphics programming, experimental design, and hardware and software interfacing.

5. I have published twenty-one research papers in professional journals and proceedings relating to user interface design; computer graphics; and spatial, stereographic, and auditory display design. I also authored a chapter on augmented reality displays in the book "Virtual Environments and Advanced Interface Design" (Oxford University Press, 1995). In addition, I created one of the first spatial musical instruments called the MIDIBIRD, which utilized the MIDI protocol, two six-dimensional spatial trackers,

[1] Human factors is a multidisciplinary field that studies how people interact with machines, technology, and their environment. It combines engineering, psychology, science, and design to create safer, more effective and efficient systems.

a music synthesizer, and a computer graphics workstation to create an advanced and novel musical instrument.

6. I consulted for The Boeing Company for over 16 years as a senior human factors engineer, user interface designer, and software architect for a wide range of advanced commercial and military programs. Many of the projects that I have been involved with include advanced software development, user interface design, agent-based software, and modeling and simulations in the areas of missile defense, homeland security, battle command management, computer aided design, networking and communications, air traffic control, location-based services, and Unmanned Aerial Vehicle ("UAV") command and control. Additionally, I was the lead system architect developing advanced air traffic controller workstations and air traffic control analysis applications, toolsets, and trade study simulations for Boeing Air Traffic Management.

7. I was also the architect of the Boeing Human Agent Model. The Boeing Human Agent Model is an advanced model for the simulation of human sensory, cognitive, and motor performance as applied to the roles of air traffic controllers, pilots, and UAV operators. In another project, I was the lead human factors engineer and user interface designer for Boeing's main vector and raster computer aided drafting and editing system that produces the maintenance manuals, shop floor illustrations, and service bulletins for aircraft produced by the Boeing Commercial Aircraft Company. Additional responsibilities in my time as a consultant include system engineering, requirements analysis, functional specification, use case development, user stories, application prototyping, modeling and simulation, object-oriented software architecture, graphical user interface analysis and design, as well as UML, C++, C#, and Java software development.

8. In 1995 and 1996, I was hired as the lead human factors engineer and user interface designer for the first two-way pager produced by AT&T. Prior to this technology, people could receive pages but had no way to respond utilizing their pager. This new technology allowed users to use a small handheld device to receive and send canned or custom text messages, access and update an address book, and access and update a personal calendar. This high-profile project involved designing the entire feature set, user interface/user interaction design and specification, as well as all graphical design and graphical design standards.

9. From 1999-2001, I was the lead human factors engineer and user interface designer for a company called Eyematic Interfaces that was responsible for user interface design and development activities

associated with real-time mobile handheld 3D facial tracking, animation, avatar creation and editing software for a product for Mattel. My work involved user interface design, human factors analysis, requirements gathering and analysis, and functional specifications.

10. I was the lead user interface designer for a company called ObjectSpeed that developed a portable handheld telephone for use in homes and businesses that had many of the same capabilities that we take for granted in mobile cellular phones. This portable multifunction device supported voice, email, chat, video conferencing, internet radio, streaming media, Microsoft Outlook integration, photo taking and sharing, etc. The ObjectSpeed device was specifically designed and developed as a portable handheld device.

11. I am the founder, inventor, user interface designer, and software architect of WhereWuz. WhereWuz is a company that produces advanced mobile software running on GPS-enabled smartphones and handheld devices. WhereWuz allows users to record exactly where they have been and query this data in unique ways for subsequent retrieval based on time or location.

12. I am the co-founder of a medical technology company called Healium. Healium developed advanced wearable and handheld interface technology to allow physicians to interact with electronic medical records more effectively. I am the co-founder of a medical technology company called StratoScientific. StratoScientific is developing an innovative case for a smartphone that turns a standard handheld smartphone into a full-featured digital stethoscope.

13. I designed and developed a large software project for Disney World called xVR that allowed the operational employees of Disney World to utilize a handheld device to view the current and historical status of all Disney World guests within multiple attractions as well as within one of their restaurants. The application could run in a real-time/live mode where it would display data collected from sensors that showed the location and status of all guests within the attraction. The xVR application could also be run in a fast-time/simulated mode. The application was developed on a laptop computer and was specifically designed to run on a variety of devices, including laptops, PCs, smartphones, and tablets.

14. I have received several awards for my engineering work relating to interface design, computer graphics, and the design of spatial, stereographic, and auditory displays, including a $10,000 scholarship from the I/ITSEC for advancing the field of interactive computer graphics for flight simulation and a Link Foundation award for furthering the field of flight simulation and virtual interface design. I have created graphics for several popular book covers and animations for a movie produced by MIRAMAR.

15. I have previously served as an expert witness in multiple matters and opined on issues relating to UI/UX design, human factors, and software engineering. A complete list of my professional qualifications, publications, affiliations, and expert witness testimony are described in my curriculum vitae, which is attached as **Appendix A**.

3.0 Methodology and Materials Considered

16. I am an independent consultant. The opinions stated in this expert report are my own and based on my personal knowledge and professional judgment. In forming my opinions, I have relied on my knowledge and experience in designing, developing, and deploying a wide range of software applications and graphical user interfaces and on the documents and information referenced in this declaration.

17. I adhered to the following methodology to evaluate the evidence presented to me and form my opinions in this case:

- I reviewed the case materials that I have listed in **Appendix B** of this report.
- I reviewed the available literature, research, and publicly available materials as noted throughout this report.
- I carefully considered the evidence and combined the evidence with my knowledge, skill, experience, training, education, and my work in the area of user interface design and software development over the last 30 years working for a wide range of different companies from small startups to Fortune 100 companies in the areas of consumer electronics, aerospace, defense, healthcare, entertainment, manufacturing, and communications to formulate my opinions.

18. Global Technica is being compensated at a rate of $735 per hour for all work in connection with this case. This compensation is not dependent on the substance of my testimony or the outcome of this matter.

4.0 The Concept of a "Dark Pattern"

4.0.1 The Complexity of Defining "Dark Patterns"

19. The concept of "dark patterns," first introduced by Harry Brignull in 2010, refers to design practices in digital interfaces that purportedly manipulate users into actions they might not otherwise take. While the term has gained some traction in academic, regulatory, and popular discourse, its definition remains nebulous and subjective.

20. The absence of universally accepted criteria for what constitutes a "dark pattern" complicates its application in evaluating user interface designs. Different interpretations of user intent, usability goals, user expectations, user aesthetics, user capabilities, and cultural expectations create significant variability in how "dark patterns" are identified and judged.

21. This paper published in 2024 states that:[2]

> However, current research faces several limitations: The first is that the prior taxonomies [of dark patterns] are inconsistent and incomplete. Most studies are confined to specific types or contexts and lack a comprehensive taxonomy. Meanwhile, existing taxonomies often overlook user impact and likely scenarios where dark patterns appear.

22. One of the most significant challenges in defining "dark patterns" is distinguishing between persuasion – a standard feature of marketing and advertising – and manipulation or fraud. Many design features that critics label as dark patterns, such as nudges toward certain actions or default options, are also widely recognized as tools to improve user experience or encourage beneficial behaviors. For instance, setting a default subscription option may streamline decision-making for users genuinely interested in the service, but it can also be perceived as manipulative by those who feel the default exploits their inattention.

23. The line between these interpretations is highly subjective, varying based on the user's perspective, intent, and prior experience, which complicates the task of creating clear and enforceable definitions. In

[2] Liming N. et al. (2024), "Shadows in the Interface: A Comprehensive Study on Dark Patterns," *Proceedings of the ACM on Software Engineering*, Vol. 1, No. FSE, Article 10, at p. 10:2, https://dl.acm.org/doi/abs/10.1145/3643736.

an analysis of dark patterns, Gray et al. (2018) note this issue, asking: "Where along this trajectory does a pattern become dark, and with what level of intentionality?"[3]

24. Moreover, dark patterns exist on a spectrum rather than as discrete, easily identifiable elements. A feature that seems deceptive in one context may appear entirely innocuous in another. For example, designing a checkout flow that simplifies steps may be viewed as a helpful improvement by some, i.e., sophisticated shoppers who desire a streamlined checkout process, and as coercion by others if it downplays or hides an option to avoid additional costs.

25. The FTC addresses this issue through the concept of a reasonable consumer. In their document ".com Disclosures: How to Make Effective Disclosures in Digital Advertising," the FTC states that, when disclosing information, "advertisers should adopt the perspective of a reasonable consumer."[4] The FTC acknowledges that "[t]here is no set formula for a clear and conspicuous disclosure."[5] The .com Disclosures go on to state, "[i]f there are indications that a significant proportion of reasonable consumers are not noticing or comprehending a necessary disclosure, the disclosure should be improved."[6]

26. In order to determine the proportion of reasonable consumers that are potentially being misled by a disclosure, it would be necessary to have some sort of objective measure, meaning something more than a subjective assessment, as there is too much uncertainty and variance surrounding subjective assessments. In other words, to determine whether a dark pattern exists, an objective data-driven assessment is necessary as there is too much uncertainty and variance surrounding such subjective assessments. As I will outline later in this report, Amazon did perform such qualitative assessments in their A/B testing.

27. This spectrum is further influenced by evolving user expectations and technological advancements, which constantly shift the baseline for what constitutes acceptable design. The inherent ambiguity of the term "dark patterns" limits its utility as a regulatory tool and risks unfairly stigmatizing standard practices that may genuinely benefit users.

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[3] Gray, C. et al. (2018), "The Dark (Patterns) Side of UX Design," *CHI '18, April 21-26, 2018, Montreal, QC, Canada*, at p. 9, https://dl.acm.org/doi/10.1145/3173574.3174108.

[4] Federal Trade Commission (2013), ".com Disclosures: How to Make Effective Disclosures in Digital Advertising," at p. 6, https://www.ftc.gov/system/files/documents/plain-language/bus41-dot-com-disclosures-information-about-online-advertising.pdf.

[5] *Id.* at p. 7.

[6] *Id.*

4.0.2 Lack of Deterministic Standards

28. User experience (UX) design involves guiding users through a sequence or series of interfaces to achieve desired outcomes, often including user and/or commercial goals. This introduces a spectrum of design practices, ranging from overt manipulation to benign persuasion, with no clear demarcation line between them. For example, a feature encouraging users to subscribe to a service might be viewed as a helpful nudge by some and coercive by others. The subjective nature of these judgments underscores the difficulty in categorizing specific designs as definitively containing "dark patterns" or not.

29. Gray et al. also note: "Paradoxically, some instances of dark patterns test well from a usability perspective (e.g., forced action, nagging), but do so at the expense of user choice."[7] Without deterministic standards, such classifications easily risk being inconsistent in their application and overly reliant on individual perspectives.

30. The absence of deterministic standards for identifying dark patterns creates significant ambiguity in evaluating design practices and specific designs. What one user perceives as manipulative, another may see as merely persuasive or even helpful. For instance, features like pop-ups highlighting limited time offers could be interpreted as deceptive pressure by some users but as valuable reminders by others who appreciate being alerted to potential savings.

31. This variability stems from the subjective nature of user experiences—even amongst reasonable consumers—which are influenced by individual preferences, cultural context, and even the specific circumstances under which the interaction occurs. Without a universally agreed-upon standard, applying consistent criteria for labeling practices as dark patterns becomes difficult and subjective.

32. Additionally, the lack of clarity around intent further complicates the issue. Many design choices aim to guide users toward specific actions, but the motivation behind these choices often falls into a gray area. Is a design created to maximize user convenience or encourage sales—both of which are legitimate business objectives—or is the design intended to obscure alternative options to deceive the consumer? The distinction is not always clear-cut and frequently depends on the evaluator's perspective.

33. Regulatory and academic discussions often conflate user outcomes with designer intent, assuming that any behavior deviating from a user's actions is the result of manipulation. However, users frequently

[7] Gray, C. et al. (2018), "The Dark (Patterns) Side of UX Design," *CHI '18, April 21-26, 2018, Montreal, QC, Canada*, at p. 8, https://dl.acm.org/doi/10.1145/3173574.3174108.

change their minds during interactions for reasons unrelated to interface design, further demonstrating the challenge of establishing deterministic standards. The Interactive Design Foundation lists several factors that affect learner behavior: motivations, cognitive biases, emotions, perceptions, past experiences, environment, context, culture, and social factors. They acknowledge the challenge this presents for UX designers:[8]

> User behavior is inherently complex and dynamic. And it can vary across different individuals and change over time. No matter what the target audience may be, users do come from diverse backgrounds—and have different expectations, preferences and needs, too. It can be a challenge for designers to cater to this diversity and make sure that inclusivity figures strongly in design. Designers have got to think about this complexity whenever they design user experiences—to make sure they actually do meet users' diverse needs and preferences.

34. Gigerenzer and Gaissmaier, in their article "Heuristic Decision Making," discuss the adaptive toolbox that humans (and animals) use when making decisions, describing it as "[t]he collection of heuristics and building blocks an individual or a species has at its disposal for constructing heuristics, together with the core mental capacities that building blocks exploit."[9] The existence of the adaptive toolbox is an indicator that there is flexibility and unpredictability in how humans approach decisions. In their summary, Gigerenzer and Gaissmaier note that "people learn to select proper heuristics from their adaptive toolbox."[10]

35. These aspects of human behavior create ambiguity that consistently undermines efforts to identify dark patterns and raises questions about the fairness of applying this label without clear, objective benchmarks.

36. Mathur et al. reviewed recent work (20 academic papers and four legislative/regulatory documents) on dark patterns and found that "the literature does not reflect a singular concern or consistent definition, but rather, a set of thematically related considerations."[11] They found a "significant variation

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[8] "User Behavior," *Interaction Design Foundation*, https://www.interaction-design.org/literature/topics/user-behavior#internal_factors-3.

[9] Gigerenzer, G., and Gaissmaier, W. (2011), "Heuristic Decision Making," *Annual Review of Psychology*, 62:451–82, at p. 456, https://doi.org/10.1146/annurev-psych-120709-145346.

[10] *Id.* at p. 474.

[11] Mathur, A. et al. (2021), "What Makes a Dark Pattern…Dark? Design Attributes, Normative Considerations, and Measurement Methods," *CHI '21, May 8-13, 2021, Yokohama, Japan*, at p. 1.

among the facets reflected in definitions [of dark patterns]. For instance, nine definitions do not involve any characteristic of the user interface, four definitions do not specify a mechanism of effect on users, eight definitions do not address the role of user interface designers, and ten definitions do not involve benefit or harm elements."[12]

37. Mathur et al. further note that another "challenge for dark patterns definitions is lack of specificity in recurring terminology."[13] They point to Brignull and Waldman who "describe dark patterns as involving 'tricks.' But what constitutes a trick?" In the same vein, "Maier and Harr note that dark patterns are 'seductive' user interfaces. [But] [w]hat makes a user interface seductive?"[14]

38. Finally, as Mathur et al. note:[15]

> Importantly, *themes* are what bind the current dark patterns scholarship together. We can only descriptively characterize the field at a high level of generality, and even then, it reflects a pair of related but distinct concepts. If we attempt to describe dark patterns with a greater degree of specificity—which would be essential for any actionable definition—the dark patterns literature immediately fragments further.

4.0.3 Grounded on Shaky Science

39. Further, researchers often categorize design elements as manipulative without considering the broader context of user interaction or intent. For instance, a study might claim that a specific checkout flow coerces users into subscribing to a service yet fails to account for users who willingly subscribe due to genuine interest or perceived value. These limitations make it difficult to establish a causal link between a design feature and user behavior, leaving the conclusions vulnerable to bias and oversimplification.

40. Adding to the challenge, much of the research in this area focuses on anecdotal examples or retrospective analyses rather than controlled experiments. Of the 76 studies reviewed by Liming et al., "[their] literature review yielded 4 articles that touched on datasets capturing dark pattern instances. Among these, 3 were primarily oriented toward the exploration of dark pattern detection tools, while one

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[12] *Id.* at p. 5.

[13] *Id.*

[14] *Id.*

[15] *Id.* at p. 9.

dedicated its focus to charting the prevalence of dark patterns."[16] Without experimental validation, it is difficult to distinguish between user behaviors that result from deliberate manipulation and those arising from users' inherent decision-making tendencies, such as preference for convenience or inertia[17] in the user interface flow. Cognitive biases often play a significant role in user decisions,[18] yet these are not always addressed in studies about dark patterns. This omission further weakens the scientific basis for claims that specific design features inherently deceive or manipulate users.

4.0.4 Diverging Expert Opinions

41. As noted above, the debate among experts about what constitutes a dark pattern often stems from the lack of objective and universally accepted criteria. For example, practices like pre-checked boxes or countdown timers are viewed by some as clear examples of manipulation, while others see them as legitimate tools to streamline the user experience or highlight time-sensitive offers. Critics might argue that these features exploit cognitive biases, yet supporters contend that they align with standard business practices to improve convenience or emphasize value propositions. This fundamental disagreement underscores the subjective nature of assessing intent and user impact, which makes categorization highly variable and often context dependent.

42. In her deposition, former Amazon UX designer and Head of User Research Jenny Blackburn (now VP of UX at Google) agreed: "I think dark pattern is, like, a trend, that, you know, that everybody thinks —thinks it means something different."[19] Blackburn's viewpoint aligns with how she defines dark patterns: "I would say that a dark pattern would be using language that obscured what the link would

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[16] Liming N. et al. (2024), "Shadows in the Interface: A Comprehensive Study on Dark Patterns," *Proceedings of the ACM on Software Engineering, Vol. 1, No. FSE, Article 10*, at p. 10:13, https://dl.acm.org/doi/abs/10.1145/3643736.

[17] "Inertia" refers to a user's tendency to stick with the default or existing state of things, even when alternative options are available. This behavioral tendency often manifests as a reluctance to actively make changes or decisions, especially if the effort required to do so seems unnecessary or inconvenient.

[18] *See* Kahneman, D. and Tversky, A. (1979), "Prospect Theory: An Analysis of Decision under Risk," *Econometrica*, Vol. 47, No. 2., at p. 279, https://web.mit.edu/curhan/www/docs/Articles/15341_Readings/Behavioral_Decision_Theory/Kahneman_Tversky_1979_Prospect_theory.pdf ("The aggravation that one experiences in losing a sum of money appears to be greater than the pleasure associated with gaining the same amount."); Samuelson, W. and Richard, Z. (1988), "Status Quo Bias in Decision Making," *Journal of Risk and Uncertainty*, Vol. 1, No. 1, at p. 8 (explaining that when "[f]aced with new options, decision makers often stick with the status quo alternative, for example, to follow customary company policy, to elect an incumbent to still another term in office, to purchase the same product brands, or to stay in the same job").

[19] Deposition of Jenny Blackburn, December 10, 2024 ("Blackburn Deposition"), at 112:11-14.

do."[20] She goes on to state that her team at Amazon did not engage in such practices: "My interpretation of it is sort of like knowingly using user experience elements in such a way that intentionally confuses users to do something that isn't what they want to do. That is certainly not what any user experience team that I worked with was motivated by or trying to accomplish."[21]

43. Moreover, experts often approach the topic from diverse disciplinary perspectives, including psychology, UX design, and law, each bringing its own biases and priorities. Psychologists may focus on the cognitive effects of interface designs, while UX designers might emphasize the balance between user goals and business objectives. Legal experts, on the other hand, are concerned about whether a practice violates consumer protection laws or constitutes deception. These divergent perspectives lead to differing interpretations of what makes a practice unethical or manipulative, further complicating any effort to establish a cohesive framework for identifying dark patterns. This lack of consensus among professionals reveals the inherent complexity of this issue and calls into question the reliability of current methods for identifying and evaluating these practices.

44. Even people from the same discipline with a background in UI/UX design can disagree on what constitutes a dark pattern. For example, Jenny Blackburn[22] testified in her deposition that consumers find it *more* clear to have a prominent enrollment button that supersedes the decline option, in part because users consistently see "no thanks" as a link across many other websites.[23] In contrast, a user researcher on her team, Reid Nelson, noted in a document produced by Amazon that he thought that "equally prominent buttons for the opt-in vs. opt-out" would lead to less customer confusion.[24] But, like many hypotheses about what constitutes clarity for customers, the "equally prominent buttons" hypothesis was disproven, as later Amazon experiments showed that customers actually had more trouble identifying the decline

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[20] Blackburn Deposition at 111:18-20.

[21] *Id.* at 112:15-24.

[22] As mentioned above, Jenny Blackburn was a former Amazon UX designer and Head of User Research, and she is now VP of UX at Google.

[23] *See* Blackburn Deposition at 110:10-24 ("Q. And you testified that it's actually helpful for consumers to have an enrollment button that is more prominent than the decline option. Did I hear you correctly? A. That's correct. When everything looks the same, it requires more cognitive attention and very close attention to detail for the user to figure out which is the one they want, versus when there is a hierarchy applied it's easier to scan and find what they really want. That's why we typically have different UX patterns for, you know, primary, secondary, tertiary treatments.").

[24] AMZN_00095807 at -08.

option when a box was put around it to make it more prominent.[25] This demonstrates how even UX designers and researchers approach dark patterns with their own biases and priorities.

4.0.5 Regulatory and Legal Challenges

45. The regulatory interpretation of "dark patterns" faces significant hurdles due to its subjective nature. Existing laws against unfair or deceptive practices often require clear evidence of harm, which can be difficult to establish when multiple factors beyond the design of an interface influence user behavior. Courts and regulators must struggle to differentiate between legitimate business strategies and unethical manipulation. This distinction often hinges on context, intent, and subjective opinion rather than objective criteria, creating substantial ambiguity in applying regulatory standards to design practices.

46. Amanda Basta, an Assistant Director in the FTC's Enforcement Division, testified in her deposition that "there's no law that says dark patterns are illegal," and agreed that "ROSCA[26] itself does not speak to dark patterns."[27] When asked if she is "aware of any FTC rules or regulations or guidance to [the] industry that defines what is permissible versus impermissible use of dark patterns," Basta stated that she is not.[28]

47. Additionally, when prompted to "identify any case in which the FTC alleged that the use of dark patterns caused a ROSCA violation" or "how many different companies in the industry use these . . . so-called 'dark patterns,'" Basta replied that she could not.[29] And when asked how prominent certain dark patterns are in "traditional marketing in the industry," Basta testified that she does not know.[30] Basta also agreed that, because whether dark patterns are unlawful is "context-dependent," "the use of a single dark

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[25] AMZN_00059693 at -693 ("In spite of our well-intended efforts at creating and enforcing clarity guardrails, some of the hypothesis developed internally to improve clarity have turned out not to be correct. . . . [W]e tested a treatment where we added a box around the decline option to make it more prominent. However, user testing revealed that even more customers had trouble identifying the decline option with this treatment.").

[26] "ROSCA" stands for Restore Online Shoppers' Confidence Act, 15 U.S.C. §§ 8401-05.

[27] Rule 30(b)(6) Deposition of the FTC (Amanda Basta), September 10, 2024 ("Basta Deposition"), at 100:2-3, 100:22-101:3.

[28] *Id.* at 102:16-21.

[29] *Id.* at 120:12-18, 121:5-10.

[30] *Id.* at 121:12-123:13.

pattern could cause a ROSCA violation," "and the use of two or three dark patterns may not cause a ROSCA violation."[31]

4.0.6 Cultural and Contextual Variability

48. The perception of dark patterns is deeply influenced by cultural norms and expectations, which can vary significantly across regions and demographics. In their analysis of dark patterns, Gray et al. "consider which dimensions of design responsibility the designer has an obligation to assess, and at what level of granularity" because it "has relevance for what user groups might be susceptible to dark patterns (e.g., vulnerable populations), or whether a pattern must be intentionally applied in a malicious manner to be 'dark.'" [32]

49. For instance, auto-renewal subscriptions may be considered a convenient feature in some countries or cultures where subscription-based services are a common and accepted practice. In contrast, the same feature might be interpreted as manipulative or deceptive in other countries or cultures that are less accustomed to such models.

50. Similarly, the use of factually true messages, such as "only two left in stock," may be regarded as helpful information in cultures that value efficiency and quick decision-making, while in others, it might be viewed as an unnecessary pressure tactic. These cultural differences highlight that a one-size-fits-all approach to identifying dark patterns is inherently flawed.

51. Contextual factors also significantly influence how users perceive and respond to interface designs. Users with high levels of digital literacy or familiarity with e-commerce sites may not feel misled by features like pre-checked boxes or upselling prompts, as they recognize these elements as common industry practices. Indeed, they may rely on these features to enhance their e-commerce experience. Conversely, less experienced users or those in regions with limited exposure to e-commerce may perceive the same features as confusing or coercive. The user's intent and expectations when interacting with a digital interface further complicate the issue. For instance, a user seeking a subscription may appreciate a streamlined process with pre-selected options. In contrast, a user exploring a free trial may view these

[31] Basta Deposition at 113:18-114:20.

[32] Gray, C. et al. (2018), "The Dark (Patterns) Side of UX Design," *CHI '18, April 21-26, 2018, Montreal, QC, Canada*, at p. 9, https://dl.acm.org/doi/10.1145/3173574.3174108.

same features as manipulative. These variations emphasize the importance of considering cultural and contextual nuances when assessing claims of dark patterns.

52. For example, in the Amended Complaint, the FTC provides the following as an example of "a design element that manipulates the user interface in ways that privilege certain specific information relative to other information": "Amazon uses Interface Interference in its Prime checkout enrollment flow, most versions of which reveal the terms and conditions of Prime only once during the purchase process, and then only in a small, easy-to-miss font."[33] This screenshot shows an example.[34]

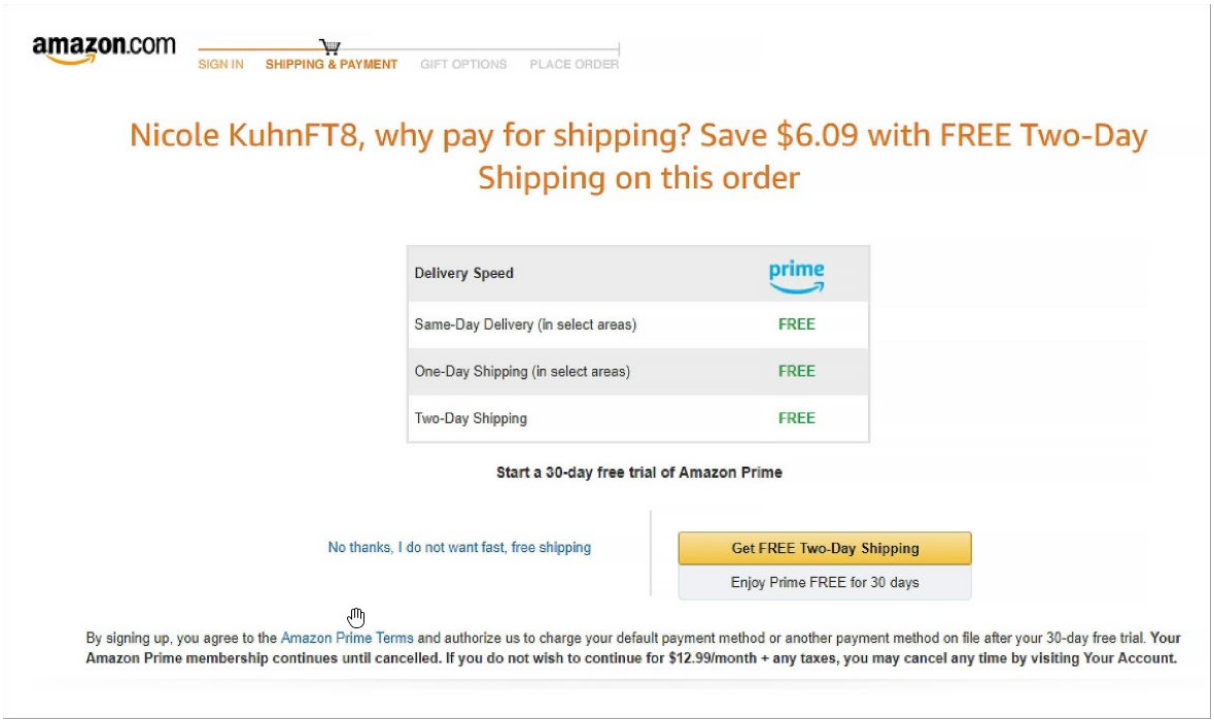

Figure 1. Terms and conditions.

53. Yet, this so-called "manipulation" likely works to the advantage of many customers, especially repeat customers, who prefer that the UX emphasize actional steps to complete their checkout process. These consumers would find the repeated display of detailed terms and conditions a hindrance to their checkout process. It is not a so-called "dark pattern," but a UX designed for efficiency.

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[33] Amended Complaint, *Federal Trade Commission v. Amazon.com, Inc. et al.*, United States District Court Western District of Washington, Case No. 2:23-cv-0932-JHC, September 20, 2023 ("Amended Complaint"), ¶ 231.

[34] Amended Complaint, Exhibit A.

4.0.7 Conclusion: A Subjective Framework

54. The lack of objective standards, reliance on shaky scientific foundations, and susceptibility to subjective interpretation with the concept of "dark patterns" raises important questions about the responsibilities of designers and companies when designing user interfaces, and undermines its utility as a deterministic framework for evaluating design practices. While regulators and the public should remain vigilant about unethical behavior, the discussions, evaluations, and potential implementations around "dark patterns" need greater conceptual clarity and empirical rigor. Without these, the presence (or absence) of "dark patterns" has devolved into a catch-all critique of business practices rather than a precise tool for ensuring fairness in digital environments.

4.1 Difficulties in Measuring "Clarity" in UX Design

55. The FTC's Amended Complaint alleges that Amazon "charged consumers without their express informed consent" in violation of the FTC Act.[35] The FTC also alleges that Amazon violated ROSCA, 15 U.S.C. §§ 8401-05, stating that Congress passed this law because "the Internet must provide consumers with clear, accurate information and give sellers an opportunity to fairly compete with one another for consumers' business."[36] Specifically, the FTC alleges that Amazon violated ROSCA in the following ways:

- "[F]ailed to clearly and conspicuously disclose all material terms of the transaction, including the price of Prime, its auto-renewal provision, and cancellation requirements, before obtaining the consumer's billing information[;]"[37]
- "[F]ailed to obtain the consumer's express informed consent before charging the consumer's credit card, debit card, bank account, or other financial account for the transaction[;]"[38] and
- "[Failed] to provide simple mechanisms for a consumer to stop recurring charges for the good or service to the consumer's credit card, debit card, bank account, or other financial account.[39]

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[35] Amended Complaint, ¶ 263-65 (Count I); *see also id.* ¶ 261 (explaining that "Section 5(a) of the FTC Act, 15 U.S.C. § 45(a), prohibits 'unfair or deceptive acts or practices in or affecting commerce'").

[36] *Id.* ¶ 266.

[37] *Id.* ¶ 272 (Count II).

[38] *Id.* ¶ 275 (Count III).

[39] *Id.* ¶ 278 (Count IV).

56. However, Amazon did communicate transaction terms and requested consent before a Prime membership transaction could be completed or a recurring charge could be canceled, so the important underlying issue is how *clearly* the Amazon user interface communicated this information.

4.1.1 Clarity in User Interface Design

57. Clarity in user interface design can be understood through objective and subjective assessments. Objective clarity can be measured through quantitative metrics like:

- **Task success rates:** The percentage of users who successfully complete a task without assistance.[40]
- **Time to task completion:** The amount of time it takes for a user to complete a task. Shorter times often reflect clear, intuitive design (unless the task inherently requires more time).[41]
- **Error rates:** The number of errors users make while performing a task. Lower error rates suggest that the interface minimizes confusion or misinterpretation.[42]
- **Eye-tracking metrics:** Measurements like fixation duration or gaze path deviations. Prolonged fixations or erratic gaze paths can reveal points of confusion or unclear elements.[43]

58. Subjective clarity, conversely, relies on qualitative assessments ranging from individual opinions to aggregation of subjective user feedback:

- **User satisfaction ratings:** Users provide feedback through surveys, often on a Likert scale (e.g., 1-5 or 1-10), to rate their satisfaction with the interface.
- **Perceived ease of use:** Users share their perceptions of how easy or difficult the interface is to use.
- **Emotional response to interface design:** Evaluates the emotional impact of the design, such as feelings of frustration, delight, or indifference.

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[40] Nielsen, J. and Budiu, R. (2021), "Success Rate: The Simplest Usability Metric," *NN/g*, https://www.nngroup.com/articles/success-rate-the-simplest-usability-metric/.

[41] "Time-on-Task or Task Completion Time," *OKRify*, https://okrify.com/time-on-task-or-task-completion-time/.

[42] "User Error Rate," *OKRify*, https://okrify.com/user-error-rate/.

[43] "Eye Tracking," *Interaction Design Foundation*, https://www.interaction-design.org/literature/topics/eye-tracking.

- **Alignment between user expectations and actual experience:** Measures the gap between what users expect and what the interface delivers. It is assessed through pre-use and post-use surveys or interviews, asking users whether the product met their expectations.

59. Subjective definitions of clarity vary greatly among users, as they are shaped by individual preferences, prior experiences, attentional resources devoted to the interface, as well as expectations. What feels intuitive and logical to one user might appear confusing to another due to the above factors as well as familiarity with similar systems, cultural and linguistic differences, or cognitive abilities (see Section 4.0.6.). For example, users accustomed to a specific design pattern for online checkout should find it easier to navigate (i.e., clearer) than other users encountering that particular design pattern for the first time. Similarly, user interface design elements such as buttons, check boxes, dropdown lists, or symbols may resonate differently depending on cultural contexts.

60. Clarity in the online shopping experience plays a pivotal role in ensuring a seamless and satisfactory user experience. This checkout process is critical because it directly impacts conversion rates and customer satisfaction. However, clarity in the checkout process is not a one-size-fits-all concept.

61. Perceptions of subjective clarity can vary significantly among shoppers due to differences in their expectations, experiences, and contexts. For example:

- **Experience level:** A seasoned online shopper might expect streamlined, minimalist designs with features like saved payment methods or one-click checkout options. A novice might prefer more step-by-step guidance and explicit labels to feel confident they are completing the process correctly.
- **Trust level:** Some users may expect additional layers of verification (e.g., two-factor authentication) to feel secure. For others, a lengthy verification process could be perceived as cumbersome and unclear or make the user suspicious (i.e., they might second-guess their decision if the process requires so many steps.)
- **Cognitive load:** Users shopping hurriedly may favor brevity and visual clarity, such as large buttons and minimal distractions. Others, particularly for higher value purchases, may prefer detailed breakdowns of costs and terms for added reassurance.

62. Similar to issues that arise when defining dark patterns, the lack of deterministic standards for subjective measures of clarity raises questions about the fairness of determining that a user interface is

unclear. This is further exacerbated when judgments are made subjectively rather than with objective benchmarks. Yet, the FTC's Amended Complaint often assesses clarity subjectively, for example:

- The Amended Complaint states: "The UPDP [Universal Prime Decision Page/Point][44] does not adequately disclose the price of the monthly auto-renewal feature of Prime. That information is located in small print at the bottom of the page, along with a link to the Prime terms and conditions."[45] This is a subjective assessment that is not supported with cited, objective data.
- The Amended Complaint states: "The mobile UPDP failed to make clear that the consumer would enroll in Prime by selecting 'Get FREE two-day shipping.' The mobile UPDP disclosed some terms, but only at the bottom of the screen in a block of small print text, which stated 'If you do not wish to continue for $12.99/month plus any applicable taxes, you may cancel anytime by visiting Your Account and adjusting your membership settings.'"[46] The assertion that this statement is not clear is also subjective and not supported with cited, objective data.
- The Amended Complaint states that, in the Prime checkout enrollment flow, Amazon makes the Decline option "difficult to locate."[47] However, this subjective assessment is not supported by cited, objective data.
- The Amended Complaint states: "Amazon also uses Misdirection in certain versions of the Prime checkout enrollment flow by failing to label the button that enrolls consumers in Prime with text indicating what pressing the button will do."[48] This is a subjective assessment of how users will understand this button. Given that there are 161.7 million Prime customers in the US, many of whom renew each year,[49] many users did, in fact, clearly understand what this button did and are satisfied Prime customers.

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[44] The UPDP (Universal Prime Decision Page) appears after a customer selects a non-Prime eligible ship option.

[45] Amended Complaint, ¶ 43.

[46] *Id.* ¶ 86.

[47] *Id.* ¶ 231.

[48] *Id.* ¶ 231.

[49] Coppola, D. (2023), "Amazon Prime retention rates in the United States between 1st quarter 2016 and 1st quarter 2023," *Statista.com*, https://www.statista.com/statistics/1251860/amazon-prime-retention-rates/.

63. The challenge of subjective clarity lies in accommodating a wide range of user needs while balancing trade-offs between simplicity for novice users and efficiency for experienced users. Furthermore, subjective clarity is not static because the interface becomes clearer as users gain familiarity and as norms around design change over time. What initially seemed complex or unclear can become more intuitive and easy to navigate. In the classic work, *The Design of Everyday Things*, Donald Norman notes that "[c]ontinual practice automates the action cycle, minimizing the amount of conscious thinking and problem-solving required to act."[50] This learning curve means that the perceived clarity of an interface improves with continued use, including use of similar design elements across different products.

64. Additionally, design norms and conventions are not fixed—they change as technology advances and user expectations shift. For example, the rise of smartphones has led to the establishment of specific conventions for mobile user interfaces, such as using gestures (like swiping and pinching) and simplified navigation structures. These conventions help standardize user experiences, making it easier for users to understand and interact with new interfaces.

65. Another example is the use of three vertical dots, often referred to as the "kebab menu" or "more options" icon, which became popular in user interface design around the early 2010s, to provide access to additional settings or actions without cluttering the main interface.[51] It is believed to have been first introduced by Google in 2014 as part of its Material design language for Android applications.[52] However, its use likely predates this formalization, as it appeared in various Android apps. The icon became a standard convention in mobile and web design due to its simplicity and effectiveness in indicating hidden or secondary options and is now intuitive to many users.

66. This familiarity occurs over time. Caroll and Rossen's chapter, "Paradox of the Active User," from the book, *Interfacing Thought: Cognitive Aspects of Human-Computer Interaction*, discusses the challenges that users face when learning new interfaces, with the clear implication that performance improves over time with learning and familiarity.[53] In another example, a study by Shen et al. found that

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[50] Norman, D. (2013), *The Design of Everyday Things*, New York: Basic Books, at p. 107.

[51] Appdrawn Team (2023), "The Ultimate Web Menu Icon Glossary," *Appdrawn Ltd*, https://www.appdrawn.com/the-ultimate-web-menu-icon-glossary.

[52] *Id.*

[53] Carroll, J. and Rosen, M.B. (1987), "Paradox of the Active User," *Interfacing Thought: Cognitive Aspects of Human-Computer Interaction*, Cambridge, MA: MIT Press, https://www.researchgate.net/publication/262322669_Paradox_of_the_active_user.

performance differences between concrete and abstract icons diminished as users became more familiar with icon sets through frequent use.[54] This suggests that interface clarity improves as users gain familiarity with the design elements.

67. Moreover, the evolution of design tools and methodologies also contributes to changing perceptions of clarity. As designers adopt new practices, such as responsive design or user-centered design, they create interfaces that are more intuitive and accessible. Over time, these practices become standard, further influencing how users perceive clarity. Users begin to anticipate certain design patterns and interactions, shaping their perception of clarity. For example, consistent use of navigation menus, intuitive icons, and responsive layouts becomes part of the user's mental model, making it easier to understand and use new interfaces.

4.1.2 Clarity and Usability

68. The concept of clarity is deeply intertwined with usability in UX design. According to the Interaction Design Foundation, "[a] design's usability depends on how well its features accommodate users' needs and contexts."[55] The Foundation goes on to list the elements that contribute to usability:[56]

- "Effectiveness—It supports users in completing actions accurately."
- "Efficiency—Users can perform tasks quickly through the easiest process."
- "Engagement—Users find it pleasant to use and appropriate for its industry/topic."
- "Error Tolerance—It supports a range of user actions and only shows an error in genuine erroneous situations. You achieve this by finding out the number, type, and severity of common errors users make and how *easily* users can *recover* from those errors."
- "Ease of Learning—New users can accomplish goals easily and even more easily on future visits."

69. The FTC's Amended Complaint focuses primarily on a single element of usability, error tolerance, aiming to eliminate alleged misunderstandings about financial commitments when subscribing. For instance, the FTC alleges that users inadvertently subscribe due to buttons that may not explicitly convey

[54] Shen, Z. et al. (2020), "Effects of Users' Familiarity With the Objects Depicted in Icons on the Cognitive Performance of Icon Identification," *iPerception*, https://pmc.ncbi.nlm.nih.gov/articles/PMC6024531/.

[55] "Usability," *Interaction Design Foundation*, https://www.interaction-design.org/literature/topics/usability.

[56] *Id.*

that a cost will be incurred.[57] They also emphasize effectiveness—but only for a subset of users—those who might struggle with understanding the signup process, such as individuals unfamiliar with digital subscriptions. The FTC places less emphasis on other usability aspects, such as efficiency (how quickly and easily users can subscribe), engagement (how pleasant or enjoyable the experience is), or ease of learning (how intuitive the process feels for first-time users).

70. Amazon and other UX designers cannot practically take such a narrow view. "A highly flexible system satisfies both experienced and inexperienced users by allowing each to complete an action through whatever method works best for them."[58] UX designers must balance all of these factors to create a usable site that is effective, is efficient, is engaging, does not induce errors, and is easy to learn for the majority of users. For example:

- **Effectiveness vs. error reduction:** "[T]he key [to effectiveness] is to be as *informative* as possible in a *meaningful way* to the user."[59] Adding extra confirmation steps for every subscription might help reduce errors for a small group of users, but it could also frustrate experienced users who find the process unnecessarily cumbersome. These experienced users might be dissuaded from signing up for Prime—a service they would actually find beneficial. Moreover, while providing additional information may reduce errors for the subset of users who read each page carefully, it would *create* confusion for the vast majority of users who do not actually read web content word for word. Indeed, it is well known amongst UX researchers and designers that people rarely read more than 20% of the text on a webpage.[60]
- **Efficiency vs. error reduction:** Making users click through multiple screens filled with detailed explanations before subscribing might prevent misunderstandings, but it would also slow down the process significantly for users who are ready to sign up.

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[57] Amended Complaint, ¶ 231.

[58] Krause, R. and Harley, A. (2024), "Accelerators Maximize Efficiency in User Interfaces," *Nielsen Norman Group*, https://www.nngroup.com/articles/ui-accelerators/.

[59] Komninos, A., "An Introduction to Usability," *Interaction Design Foundation*, https://www.interaction-design.org/literature/article/an-introduction-to-usability.

[60] Nielsen, J. (2008), "How Little Do Users Read?," *Nielsen Norman Group*, https://www.nngroup.com/articles/how-little-do-users-read/.

- **Engagement vs. error reduction:** When it comes to engagement, "[a]esthetics matter. . . . Proper layouts, readable typography and ease of navigation all come together to deliver the right interaction for the user and make it engaging."[61] Overloading the signup page with disclaimers and redundant text might ensure clarity for some users, but it could overwhelm others, making the design feel cluttered and unappealing. Users might become inclined to skim text-heavy screens, missing important information.[62]
- **Ease of learning vs. error reduction:** According to the Interaction Design Foundation, "[t]he best way to support ease of learning is to design systems that match a user's existing mental models" where "[a] mental model is simply a representation of something in the real world and how it is done from the user's perspective."[63] A design that prioritizes error prevention by including excessive guidance may alienate experienced online shoppers who find that it does not match their mental model, or who may even find it condescending or overly prescriptive.

71. To maintain a well-rounded user experience, Amazon must balance all five usability elements.

72. The issue of clarity versus consistency is also of concern. Consistent UX design can provide clarity by creating a predictable and familiar experience for users. While a particular design decision might seem clearer in isolation, it can disrupt the overall experience if it does not align with users' established patterns or expectations. For example, consider a series of forms where most "Submit" buttons are in the bottom right corner. If you place one form's submit button in the top right because it makes more sense for that specific form, you are likely to make the overall experience worse. Users have built up expectations from the consistent pattern and breaking it—even with good intentions—is disruptive.

73. There are several reasons why consistency matters. Consistency in design allows users to anticipate what will happen next. They learn from their previous interactions, which reduces the cognitive load and helps them navigate the system more easily. They can quickly recognize familiar colors, icons, or layouts, minimizing the need to remember specific instructions for each new element. They can learn

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[61] Komninos, A., "An Introduction to Usability," *Interaction Design Foundation*, https://www.interaction-design.org/literature/article/an-introduction-to-usability.

[62] *See* Nielsen, J. (2008), "How Little Do Users Read?," *Nielsen Norman Group*, https://www.nngroup.com/articles/how-little-do-users-read/ (explaining that users become "quite erratic" when reading longer pages and that "people read only about 10% of the text" when presented with "huge word counts" on terms and conditions pages).

[63] Komninos, A., "An Introduction to Usability," *Interaction Design Foundation*, https://www.interaction-design.org/literature/article/an-introduction-to-usability.

more quickly, as they are able to transfer their knowledge from one part of the system to another. Consistency creates the perception of a professional, well-designed interface, helping the user to navigate the interface more efficiently and to earn the user's trust.

74. The importance of consistency is well recognized. One of Jakob Nielson's ten usability heuristics is Consistency and Standards: "Users should not have to wonder whether different words, situations, or actions mean the same thing."[64] Apple's Human Interface Guidelines also emphasize the importance of consistency, instructing, for example, to "[m]aintain visual consistency across all interface icons in your app"[65] and "[a] consistent layout that adapts to various contexts makes your experience more approachable and helps people enjoy their favorite apps and games on all their devices."[66] Google's report, "The State of Design Systems: 2020," surveyed organizations' design systems, which include "component libraries, style guides, design guidelines, and content guidelines."[67] Survey data indicated that "a stated goal for using a design system is maintaining product consistency." [68]

4.2 Timeline and Analysis of Amazon's Ongoing Efforts to Study and Improve "Clarity"

75. Amazon routinely conducts A/B testing and user experience research to optimize its interfaces. A/B testing (also called split testing) is a method of comparing two versions of something to see which performs better. In this approach, Version A is typically the current or "control" version, and Version B is a modified version with a specific change. A random group of users is selected to interact with Version B, and data is collected to determine which version performed better according to the predefined success metrics. This evidence-based approach helps teams make informed decisions about which design choices are most effective.

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[64] Nielsen, J. (2024), "10 Usability Heuristics for User Interface Design," *Nielsen Norman Group*, https://www.nngroup.com/articles/ten-usability-heuristics/.

[65] "Icons," *Apple*, https://developer.apple.com/design/human-interface-guidelines/icons/.

[66] "Layout," *Apple*, https://developer.apple.com/design/human-interface-guidelines/layout.

[67] Hamilton, A. (2020), "The State of Design Systems: 2020," *Material Design*, https://m3.material.io/blog/research-state-of-design-systems-2020.

[68] *Id.*

76. A/B testing is an established proven procedure. Kohavi and Longbotham, for example, note: [69]

> Online-controlled experiments [their term for A/B testing] started to be used in the late 1990s with the growth of the Internet. Today, many large sites, including Amazon, Bing, Facebook, Google, LinkedIn, and Yahoo!, run thousands to tens of thousands of experiments each year testing user interface (UI) changes, enhancements to algorithms (search, ads, personalization, recommendation, etc.), changes to apps, content management system, etc. Online-controlled experiments are now considered an indispensable tool, and their use is growing for startups and smaller websites."

77. A/B testing, while not a full scientific study for measuring design clarity, does help teams make data-driven decisions rather than relying on assumptions or personal preferences:

- Instead of debating whether a UX change will be beneficial, A/B testing lets you **measure actual user behavior**. This replaces subjective opinions with concrete data about how design changes impact user actions, like click-through rates, time on page, or conversion rates. A/B testing provides quantitative data (versus subjective opinions), allows a direct comparison between an existing version and a new variant, and helps to optimize for specific goals, such as conversion rate.[70]
- By testing changes with a subset of users before full deployment, a company can catch potential issues early, **reducing risk**. If a design change negatively impacts key metrics, you can identify this before affecting your entire user base.
- A/B tests often **reveal surprising insights about user behavior** that challenge assumptions. For example, a company might discover that users respond better to different language, layouts, or visual hierarchies than what designers initially thought would work best.[71]

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[69] Kohavi. R., and Longbotham, R. (2017), "Online Controlled Experiments and A/B Testing" in *Encyclopedia of Machine Learning and Data Mining*, eds. Sammut, C. and Webb, G. I., Boston: Springer , at p. 1, https://www.researchgate.net/publication/316116834_Online_Controlled_Experiments_and_AB_Testing.

[70] AWA Digital (2023), "Usability Testing vs AB Testing: Which Is Right For You?," *AWA*, https://www.awa-digital.com/blog/usability-testing-vs-ab-testing/#the-advantages-of-ab-testing.

[71] Kohavi, R. et al. (2020), *Trustworthy Online Controlled Experiments: A Practical Guide to A/B Testing*, Cambridge, U.K.: Cambridge University Press, at pp. 13-14 (explaining that "[o]nly one third of the ideas tested at Microsoft improved the metric(s) they were designed to improve" and that "most who have run controlled experiments in customer-facing websites and applications have experienced this humbling reality: *we are poor at assessing the value of ideas*").

- A/B testing enables incremental optimization by letting the company test smaller changes systematically. Each successful test builds on previous learnings, creating a cycle of **continuous improvement** in the interface.[72]

78. Although A/B testing is a useful practice in UI design, it is not without limitations. First, A/B testing is not useful for testing multiple changes at a time because it lacks the ability to tell you the impact of each individual change.[73] A HubSpot guide on A/B testing warns: "[Y]ou'll want to isolate one independent variable and measure its performance. Otherwise, you can't be sure which variable was responsible for changes in performance."[74] Second, A/B testing only tells you *if* user behavior changed, it does not tell you *why* user behavior changed.[75] This is because "[c]orrelation does not imply causality," and "overly relying on . . . observations [from an A/B] test leads to faulty decisions."[76] There are several factors besides causation that can cause correlation:

- **Spurious (or "nonsense") correlation**, where two variables are correlated only by chance or accident.[77]
- **Confounding variables**, which are unmeasured variables affecting the results.[78] For example, ice cream sales may be positively correlated with the incidence of sunburn, but that does not

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[72] *See* Kohavi, R. et al. (2020), *Trustworthy Online Controlled Experiments: A Practical Guide to A/B Testing*, Cambridge, U.K.: Cambridge University Press, at p. 14 ("In practice, improvements to key metrics are achieved by many small changes: 0.1% to 2%.").

[73] Neusesser, T. (2024), "A/B Testing 101," *Nielsen Norman Group*, https://www.nngroup.com/articles/ab-testing/.

[74] Nicholson, R. (2024), "How to Do A/B Testing: 15 Steps for the Perfect Split Test," https://blog.hubspot.com/marketing/how-to-do-a-b-testing.

[75] Neusesser, T. (2024), "A/B Testing 101," *Nielsen Norman Group*, https://www.nngroup.com/articles/ab-testing/.

[76] *See* Kohavi, R. et al. (2020), *Trustworthy Online Controlled Experiments: A Practical Guide to A/B Testing*, Cambridge, U.K.: Cambridge University Press, at p. 2; *see also id.* at p. 8 (providing an example from Microsoft Office 365 UX design: "An example demonstrating this fallacy comes from Microsoft Office 365. Users of Office 365 that see error messages and experience crashes have lower churn rates, but that does not mean that Office 365 should show more error messages or that Microsoft should lower code quality, causing more crashes. It turns out that all three events are caused by a single factor: usage. Heavy users of the product see more error messages, experience more crashes, and have lower churn rates.").

[77] Haig, B. (2003),"What is a Spurious Correlation?," *Understanding Statistics*, Vol. 2, Issue 2, at p. 127 (providing examples including "the high positive correlation between birth rate and number of storks for a period in Britain" and "the negative correlation between birth rate and road fatalities in Europe over a number of years")

[78] Frank, K. (2000), "Impact of a Confounding Variable on a Regression Coefficient," *Sociological Methods & Research*, Vol. 29, No. 2, at p. 147-48.

mean that ice cream causes sunburn. Instead, a confounding variable, temperature, causes people to eat more ice cream and to spend more time outside where they are more likely to get sunburned.

- **Simpson's paradox**, a statistical phenomenon "where an association between two variables in a population emerges, disappears or reverses when the population is divided into subpopulations."[79]

79. Amazon used A/B testing to investigate potential issues with the Prime signup process. In these efforts, Amazon has wrestled with the concept of clarity as well:[80]

> In our efforts to date, we have been hampered by the subjective nature of assessing clarity and the lack of a defined framework for measuring clarity related improvements and tradeoffs. Our hypothesis for clarity enhancing improvements has been that these would reduce upfront signups, but we would see increased benefit usage and member yield due to more aware and engaged members. However, from WW [worldwide] clarity experiments dating back to 2018, we have consistently not found this to be the case.

80. This again shows that Amazon's well-intentioned efforts to improve clarity in a complex environment with a very large number of diverse users may not demonstrate the intended result when data are analyzed.

81. Decisions to not permanently implement all Clarity changes (see Section 4.2.3 below) reflect an evidence-based strategy, ensuring that changes meet user needs without causing disproportionate harm to the business. Further, they follow an iterative approach to addressing clarity that ensures ongoing improvements while testing the impact of UX changes on certain performance indicators, such as upfront signups, usage, and engagement.

82. In this section, I will look at three efforts by Amazon, based on Amazon's hypotheses to enhance clarity regarding Prime signups and how, in each case, the expected goals were not achieved.

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[79] Sprenger, J. and Weinberger, N. (2021), "Simpson's Paradox," *Stanford Encyclopedia of Philosophy*, https://plato.stanford.edu/entries/paradox-simpson/.

[80] AMZN_00022508 at -10.

4.2.1 Project Lucent (2018)

83. In 2018, the Amazon Customer Experience Team (CXT) prioritized 24 user frustrations that Amazon sought to resolve.[81] The top three identified frustrations were Prime Signup Frustration, Finding the Lowest Item Price, and Not Receiving Free Shipping.[82] As part of an effort to reduce customer frustrations down to zero, known internally as Project Lucent, Amazon worked to address Prime Signup Frustration:[83]

> Through customer anecdotes, VOC [voice of the customer] data and in-depth analysis of sign up metrics, Prime identified the need to increase clarity during the Prime sign-up and on-boarding process. This covers simplifying cluttered templates, moving away from design paradigms which could be confusing to the customer and making the sign-up flow more intuitive. As a metric to measure improved customer clarity, Lucent is currently focused on reducing Prime Refund Exception Concessions (RECs) and CS [Customer Service]led cancellations of Prime. RECs are concessions given to customers outside the standard Prime concession policy and are typically given by CS to reduce customer frustration.

84. One objective of Project Lucent was to "improve clarity of messaging on the Prime sign up upsells."[84] Amazon conducted 41 tests in the US to "improve message clarity."[85] The results, however, defied expectations:[86]

- Prime signups dropped significantly, but conversion rates to paid memberships remained flat.
- While customer service cancellations slightly decreased, the anticipated downstream improvements in benefit usage and engagement did not materialize.

85. According to an internal Amazon document:[87]

> We have tested 7 potentially clearer treatments on UPDP this year and, our results are unexpected. We expected clearer messaging to lead to fewer Prime sign ups, higher conversion rate to paid Prime (for customers who sign up),

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[81] AMZN-PRM-FTC-002656996 at -6996.

[82] *Id.*

[83] *Id.*

[84] *Id.* at -7006.

[85] *Id.* at -6996.

[86] AMZN-PRM-FTC-002657046 at -7047.

[87] AMZN-PRM-FTC-002656996 at -6996.

> lower CS cancels, and limited short-term impact to Prime's paid member balance (the assumption being that the members we lost would have not converted to paid Prime). However, the weblab results show that while Prime sign-up are significantly lower, the conversion rate did not improve — as conversion was flat for all the treatments tested.

86. Project Lucent's hypothesis was always that signups would be lower if the messaging was changed to deemphasize the benefits of signing up.[88] In other words, the lower signups were an expected result. The FTC's perspective is that, prior to any efforts by Amazon to enhance clarity, customers were inadvertently signing up for Prime. Customers did not understand how Prime worked and that they would be billed. These customers eventually regretted signing up and many of them canceled Prime.[89]

87. If this is the case, then improved UX clarity would lead to fewer inadvertent signups, fewer regrets, and *fewer* cancellations. There were fewer signups, as expected; however, the cancellations (i.e., the 90-day conversation) rate did not change.[90] If the conversion rate did not improve, then the clarity improvements that were expected to lead to fewer inadvertent signups did not have this expected effect.

88. The 90-day conversion rate is a meaningful, objective metric. It reflects what percentage of Amazon customers, having spent 90 days as Prime Customers, are sufficiently content with Prime that they continue their membership. Essentially, they are repeat customers, and they are aware of the costs of Prime, as they have seen at least two credit card statements. It allows Amazon to capture actionable commitment data on new customers within a reasonable time frame (e.g., a 365-day conversion rate would require them to wait a year for results.).

89. These results suggest that there is an alternative explanation. For example, Amazon users may have understood how Prime signup works but, because there was less emphasis on the benefits in the so-called "clearer" UX, users who were on the fence elected not to sign up for Prime. This did not occur because they were less confused about how Prime worked, but because they felt Amazon's marketing efforts were less subjectively persuasive. Alternatively, because persuasive elements were de-emphasized, customers may have hesitated rather than signing up immediately, delaying or forgoing membership. Another way to look at this is that the modified UX may have overcorrected by focusing on clarity of

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[88] AMZN-PRM-FTC-002656996 at -6996 ("We expected clearer messaging to lead to fewer Prime sign ups, higher conversion rate to paid Prime (for customers who sign up), lower CS cancels, and limited short-term impact to Prime's paid member balance (the assumption being that the members we lost would have not converted to paid Prime).").

[89] *See* Amended Complaint, ¶¶ 177-81.

[90] AMZN_00138080 at -80; AMZN-PRM-FTC-002656996 at -7004.

terms and conditions, at the expense of clearly explaining the benefits, leading fewer people to recognize the full value of Prime membership during the signup process. This neither benefits Amazon, which loses business, nor Amazon customers, who have foregone a service they would have valued.

90. Another potential explanation is that the reduced emphasis on benefits discouraged some casual or impulse signups who *did* understand how Prime worked but were somewhat indifferent at that time to signing up, filtering out customers who maintained their Prime membership beyond 90 days and customers who canceled within 90 days. If this is the case, then the underlying conversion rate would be unaffected by the Project Lucent changes. This could explain why the absolute number of signups decreased while the conversion rate remained stable. As above, this situation neither benefits Amazon nor those customers who would have valued Prime.

91. Although the changes in Project Lucent did not appear to enhance customer understanding, the changes did have an impact on Amazon's business. One document explicitly stated, "Prime's initiatives to address customer frustrations have been accompanied by significant impacts to the business without a clear measure that we have successfully improved the [customer experience]."[91] Another document stated: "The 90-day conversion did not change significantly for any of the treatments and was unable to offset the impact of drop in sign-ups."[92] So, from Amazon's perspective, based on objective measures of clarity, there was no evidence that clarity had been enhanced and the changes they made had negatively affected their business. Amazon is entitled to the benefits of honestly marketing the benefits of their products, including Prime.

4.2.2 ASINization (2019)

92. ASINization was another clarity initiative.[93] An ASIN (Amazon Standard Identification Number) is a unique 10-digit number that Amazon assigns to each of its products and partner products. ASINization refers to Amazon's 2019 effort to enhance clarity by treating a Prime subscription as a standalone item in the shopping cart:[94]

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[91] AMZN_00022508 at -08.

[92] AMZN-PRM-FTC-002657046 at -7047.

[93] AMZN_00059693 at -699.

[94] *Id.*

> Checkout ASINization was tested in Q3 2019 as a product solution intended to improve sign up clarity by 1) displaying the Prime plan as an ASIN on Single Page Checkout (SPC), 2) enabling undo functionality in that customers can delete the Prime ASIN, and 3) delaying sign up until order is placed (unlike in digital pipeline, where signup is immediate).

93. The hypothesis was that this approach would increase transparency, giving customers greater visibility and control over their Prime subscriptions. However, again, the results were not as expected:[95]

> Our understanding of clarity does not always match customers' perception. In spite of our well-intended efforts at creating and enforcing clarity guard rails, some of the hypotheses developed internally to improve clarity have turned out not to be correct. [For example,] the hypothesis behind our push for Prime ASINization was that by adding Prime as ASIN to the shopping cart on single page checkout (SPC), we can increase visibility into the Prime purchase and provide customers the option to remove the subscription. However, in customer research studies, we found that customers didn't notice the added ASIN as part of their order or realize that they have the option to remove it.

94. Research studies demonstrated that customers did not "notice" the ASIN that Amazon had added to enhance clarity.[96] It is plausible that the interface had become more cluttered, making individual elements less noticeable. It is also plausible that experienced online shoppers are conditioned not to look closely at ASIN items listed at checkout, just as many people do not double-check store receipts. It would take a dedicated study to answer this question, but the point is that an intended enhancement to improve clarity did not have the intended effect. This is exactly why Amazon does A/B testing and makes UX decisions based on concrete data.

95. This same document outlines another instance where an intended enhancement to clarity did not have the intended effect:[97]

> [A] common feedback on the Prime upsell interstitial in checkout is that the negative CTA [call to action] (decline option) is not as prominent as the positive CTA. In DE, we tested a treatment where we added a box around the decline option to make it more prominent. However, user testing revealed that even more customers had trouble identifying the decline option with this treatment (Appendix C). Therefore, we cannot rely on internal perspectives alone to

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[95] AMZN_00059693 at -693.

[96] *Id.*

[97] *Id.*

> develop clarity improvements and must actively solicit and incorporate user feedback in developing and validating experiment hypotheses.

96. It is possible that users are conditioned to see "Decline" options given less emphasis than Accept options, as this is a common convention. Seeing an emphasized Decline option did not conform to this mental model and was confusing, making the UX, in fact, less clear to users.

97. The internal Amazon document further noted:[98]

> In US testing we found that Checkout ASINization was a blunt instrument, leading to large drops in settled paid members [redacted] on UPDP, without significant, measurable improvements in customer engagement or activity [as measured by customer count, 30 paid day yield, and 30-day yield], and UX studies found customers were still unclear they had signed up for Prime. Our analysis showed *the drop in signups was driven mainly by customers who do not place their order*, because in contrast to the non-asinized UPDP experience with a one click sign up button, Prime Asinization requires the customer to complete checkout before their Prime membership starts.

98. Amazon deprioritized ASINization after concluding that the approach failed to meet its objectives. The initiative's rollback underscored the importance of validating UX changes through comprehensive testing and aligning them with customer behavior. Changes expected to improve clarity may in fact not do so. As noted, the drop in signups was driven by orders that were not placed—in other words, a decision to abandon the shopping cart entirely versus a decision to complete a purchase without enrolling in Prime. It is also noteworthy that many customers did not notice the ASINization of Prime, and adding a box around the Decline option confused customers; these issues again indicate the importance of A/B testing as a tool to validate hypothesized outcomes of UX changes.

4.2.3 Clarity Changes (2020)

99. As part of their ongoing efforts to improve the customer experience for consumers on the margin, Amazon continued to focus on clarity issues.

100. In September 2020, Amazon implemented several clarity-focused changes to improve transparency in Prime subscription offers. These changes included changing the Decline option from a

[98] AMZN_00059693 at -699 (emphasis added).

link to a "No thanks" button; making Prime's price visible outside the terms and conditions; and re-labelling the enrollment button with wording that included "Prime" or "Free Trial."[99]

101. As a result, "[t]here was a [redacted] in benefit usage for HO [Hard Offer] signups [redacted][100] but it [redacted] for FT [Free Trial] signups[redacted][101] and the changes were rolled back in Dec 2020.[102] In the document describing the September 2020 tests, Amazon notes that for "clarity experiments dating back to 2018," they consistently found that "[w]hile clarity enhancements reduce signups and paid members, we have not observed a corresponding increase in member yield or increased benefit usage, which suggests that our members as a whole are not necessarily better informed or engaged."[103]

102. In her deposition, UX Researcher Jenny Blackburn explained why having a decline link rather than a decline button is helpful for the user from a design perspective:[104]

> I think based on my experience as a user experience designer, what's really important here is a couple of things. One, that the signup and the decline to sign up option are right next to each other, so that it's easy for the user to pick the one they want. Second, the fact that it uses plain language. In particular, I would call out the fact that the link starts with "no thanks," which is a really common pattern across upsells. And then it is not uncommon that the button that is associated with the upsell has more prominence. That actually is helpful to a user, as they scan the page. And it's often the case that the "no thanks" link is treated with the blue hyperlink treatment. Again, like, if you were to squint and look at this page, a lot of consumers would say that the blue link is the "no thanks," because that's a common best practice across these types of interstitials.

Also:[105]

> Q: And you testified that it's actually helpful for consumers to have an enrollment button that is more prominent than the decline option. Did I hear you correctly?

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[99] AMZN_00022508 at -09.

[100] Note that I calculate this change as +0.84%.

[101] Note that I calculate this change as -16.3%.

[102] AMZN_00022508 at -09.

[103] *Id.* at -10.

[104] Blackburn Deposition at 108:16-109:18.

[105] *Id.*at 110:10-24.

> A. That's correct. When everything looks the same, it requires more cognitive attention and very close attention to detail for the user to figure out which is the one they want, versus when there is a hierarchy applied it's easier to scan and find what they really want. That's why we typically have different UX patterns for, you know, primary, secondary, tertiary treatments.

103. In fact, multiple consumers who filed declarations on behalf of the FTC, claiming they had unknowingly or accidentally enrolled in Prime, testified that they *did* understand what options to choose in order to enroll in or opt out of Prime when shown images of Amazon's checkout flow during their depositions. Brian Smith, one such consumer declarant, testified that he understood the "yellow button" with "get free two day shipping" enrolled him in Prime, whereas "No thank you, I do not want free two day shipping" allowed him to decline enrollment.[106] Similarly, Lois Berkowitz, when shown the checkout flow during her deposition, testified that she would have "gone directly to no thanks without reading the rest of the page" because she understood that is how she would decline enrolling in Prime.[107]

104. As I have described in this section, when Amazon changed aspects of the UX in an effort to increase clarity, they also changed the language they were using to sell their product. The likely effect of these simultaneous changes was that some customers who might have been persuaded by the old language were not persuaded by the new language and chose not to sign up for Prime. In this case, signups declined for reasons that have little to do with clarity. Rather, Amazon simply changed the language associated with the benefits of having Prime, and this resulted in fewer Prime customers as they were not persuaded to purchase Prime.

4.3 Lessons Learned from These Tests

4.3.1 Challenges in Assessing Clarity

105. Clarity is a slippery concept, and changes that, on the surface, may be expected to increase clarity do not always lead to an improved customer experience. Amazon saw this repeatedly when it tested changes that did not enhance clarity when objectively measured by the 90-day conversion rate. As explained above, this metric reflects the percentage of Amazon customers who have spent 90 days as Prime Customers, indicating that they are sufficiently content with Prime and thus continue their

[106] Deposition of Brian Smith, December 17, 2024, at 69:4-20.

[107] Deposition of Lois Berkowitz, December 9, 2024, at 171:17-22.

membership. The 90-day conversion rate is a meaningful measure as it controls for users who may have signed up for Prime without intending to do so and users who only signed up to get the short-term free Prime trial. In addition, after 90 days of being subscribed to Prime, consumers would have seen at least two credit card statements.

106. Proxies for clarity are imperfect measures, and changes intended to enhance clarity may not do so. For example:

- A customer may have an objective in the checkout process that is not supported by efforts to enhance clarity. Wordiness or any extra complexity added to this process, to make it more understandable to a minority of inexperienced customers, may be seen as friction, an obstruction, or an inconvenience by the majority of customers. Examples would include wordy explanations that would need to be processed by the user or extra confirmation steps that would need to be read, processed, and acted upon.
- A change intended to enhance clarity may go unnoticed. For example, customers did not notice the ASIN that was added to the Single Page Checkout.[108]
- Some customers may not understand a message being conveyed even when there is evidence that it is clearer. In any large population, there is always a percentage of customers that is easily confused and/or excessively unreasonable. For example, when Amazon added a box around the decline option to make it more prominent, customers actually found it more confusing.[109]
- Other factors may be confounding the data. For example, ASINization required customers to place the associated order to complete their enrollment in Prime, while, pre-ASINization, Prime enrollment could be completed without the associated order being placed. Thus, the drop in signups following ASINization may have been driven mainly by customers who did not complete the order process.[110]

[108] AMZN_00059693 at -693.

[109] *Id.*

[110] *Id.*

4.3.2 Effects of Expectation Bias

107. It is likely that expectation bias is somewhat driving the FTC's perception of Amazon's business practices.

108. Expectation bias is a phenomenon in which people's expectations about the outcome of an event or experiment can influence the results of that event or experiment. This can happen when people's subjective expectations about the outcome affect how they perceive or interpret the information that is presented to them.[111] Expectation bias causes people to perceive information inaccurately and make faulty judgments.[112]

109. If one believes that dark patterns exist and that Amazon (or any other e-commerce web site) intentionally makes things unclear to increase initial customer signups, he or she is more likely to interpret otherwise innocuous UX elements as unclear or constituting dark patterns. However, decisions to sign up for or decline Prime offers are driven by many factors.

110. It is also important to entertain alternative hypotheses, particularly given that the 90-day conversion rate did not change, as would be expected if a clearer signup process led to fewer inadvertent signups.[113] For example, when Amazon changed aspects of the UX to increase clarity, they also changed the language they were using to sell their product, with the likely effect that the new language did not persuade some customers whom the old language might have persuaded and who chose not to sign up for Prime. As explained above, Amazon tested multiple clarity changes at once, and due to the limits of A/B testing, it is difficult to tell what the exact impact of each change was on user behavior. In this case, signups may have declined for reasons that have little to do with clarity. For example, because Amazon changed the language associated with the benefits of having Prime, fewer Prime customers may have signed up because they were not persuaded to purchase Prime by the new marketing copy.

111. Indeed, Amazon users may cancel Prime for many different reasons:

- A customer may sign up for Prime, fully understanding the terms but then change their mind about the value of the service and subsequently cancel.

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[111] "What is Expectation Bias in Behavioral Economics?," *The Behavioral Scientist*, https://www.thebehavioralscientist.com/glossary/expectation-bias.

[112] *Id.*

[113] Due to the very large number of Amazon.com customers, it is to be expected that there will be a certain, irreducible number of inadvertent signups.

- A customer may sign up for Prime with the intention to cancel within 30 days to enjoy the economic benefits of a limited period of free shipping without having to pay anything at all. This is similar to a customer signing up for a free trial of any product or service with the intent to relatively quickly return the product or cancel the service before being required to pay.
- A parent may cancel an account that a child or another adult initiated without permission.
- A parent may cancel the subscription to Prime that the child either accidentally or purposely initiated on the parent's account.
- The account signups themselves may be spurious and not even driven by actual users, but rather software bots or hackers. For example, Amazon notes that "bad actors attempting card testing (resulting in customers' seeing unrecognized charges) is a big driver of mistaken signup issues. In 1H 2019, we observed [redacted] of our cancelation survey respondents stating that they were unaware of having signed up for Prime. In Q3 2019, when we dialed up Fraud rules to make it harder for bots to card test and enter the program, this number [redacted]."[114]

112. An assumption underlying the complaint is that decreases in Prime signups following changes designed to increase clarity resulted from fewer customer misunderstandings. However, these changes in the number of Prime signups may also be unintended artifacts of the UX changes, such as the decrease in Prime signups due to abandoned shopping carts resulting from the ASINization changes.[115] It is important to realize that there are many interrelated factors affecting customer decisions, and businesses should rely on objective data when looking at customer behavior to determine if it is an unclear UX that is truly driving that behavior, rather than assuming that dark patterns are the cause and then subsequently assessing the evidence with that bias.

4.3.3 The Importance of Objective Data

113. As a responsive, customer-driven organization, Amazon has undertaken several data-driven efforts to improve the clarity of their UX (discussed above in Section 4.2). It is important to understand the complexity of this effort.

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[114] AMZN_00022508 at -09.

[115] AMZN_00059693 at -699.

114. Amazon's many customers differ in many ways: age, education, online literacy and experience, language, objectives using Amazon's services, degree of patience, the devices that they are using to access the Amazon checkout flow, the time they have available to complete a purchase, and so on. The myriad factors combine in a unique way for each user to represent many different use cases. Given this diversity of users, it is very difficult to predict the aggregate outcome of a UX change. Customers simply may not behave or comprehend as one would expect them to when they encounter the changed UX. Consequently, it is unwise and unreliable to rely on anecdotal, subjective evidence as the basis for major changes from a UX perspective. This is why Amazon conducts objective UX testing and relies on the data from these tests.

115. It is reasonable to assume that, given the millions of Amazon users in the US, these customers will fall along a distribution (e.g., bell curve), where some are quite dissatisfied and others are quite satisfied with Amazon generally, and with the Amazon Prime signup flow, specifically. If even a small percentage is highly dissatisfied with Prime, that is still a very large number, and Amazon would expect to see many complaints. This is driven by the absolute number of Prime customers, rather than by a pervasive sense of dissatisfaction with the company.[116] This is another reason that it is important to rely on objective data rather than letting anecdotal, subjective data drive business changes.

116. In her deposition, former Head of User Research Jenny Blackburn acknowledged the need for end-user testing to verify the clarity of the UX while also explaining why she believed the UX was well-designed:[117]

> Whether it's clear or confusing is up to how it performs with end users. When I look how the page is laid out and the content on the page, it looks to me like a very reasonable, if dated, approach. It has a clear upsell value proposition. It's then indicating the specific item in the user's cart that qualifies and the specific benefit to the user if they sign up for the Prime program. It has a clear hierarchy, and items that a user would expect to find near each other are near each other. So, for example, the button to sign up for Prime and the link to decline are placed side by side. They use clear, plain language. And then the terms and conditions

[116] If out of every 10,000 customers, 9,999 were satisfied with the Prime membership and cancelation process and only one customer was not satisfied, this would result in 16,170 complaints in the United States alone. In other words, if only 0.01% of US Amazon customers made a complaint annually, Amazon will still receive over 16,000 complaints a year. It would be tempting to conclude that the Prime membership and cancelation process was broken given this large number of complaints, but that would be an incorrect conclusion to draw.

[117] Blackburn Deposition at 105:14-106:15.

> are immediately below the signup button and very clearly stipulate the terms. So from a UX design best practices, this page seems very reasonable.

117. When Amazon looked at the objective data from its clarity tests, it did not support the hypothesis that "clearer" language in the Prime signup process would generate a higher 90-day customer retention rate, a meaningful measure of long-term customer satisfaction.

4.3.4 Amazon's Success

118. Amazon is often cited as a leader in e-commerce UX. For example, the Baymard Institute ranks Amazon in the top 1% of UX performance.[118] Amazon also has industry-leading retention rates. According to Statista:[119]

> In the first quarter of 2023, Amazon Prime had 72 percent of users subscribe to the service after the 30-day trial. The conversion rate has increased, as it was 67 percent in the same period of 2022. Moreover, 97 percent of Amazon Prime members renewed their membership for a year, and 99 percent renewed it for a second year over the first three months of 2023.

119. In comparison, Statista reports that consumer goods and retail subscriptions had an overall conversion rate of 34.2 percent in 2022,[120] roughly half of Amazon's conversion rate for the same period.[121]

120. This data indicates that Amazon provides a positive user experience for many customers. One of the ways it is doing so is by creating a usable site that is effective, efficient, engaging, does not induce errors, and is easy to learn for most users. Granted, some customers are dissatisfied and may have misunderstood the Prime signup process. This is inevitable given the high volume of customers that Amazon has. However, while being aware of this issue and working to resolve it, Amazon remains focused

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[118] "Amazon UX Case Study," *Baymard Institute*, https://baymard.com/ux-benchmark/collections/top1-award.

[119] "Amazon Prime retention rates in the United States between 1st quarter 2016 and 1st quarter 2023," *Statista.com*, https://www.statista.com/statistics/1251860/amazon-prime-retention-rates/.

[120] "Conversion rates for subscription commerce worldwide in 2022, by vertical," *Statista.com*, https://www.statista.com/statistics/1419664/subscription-commerce-conversion-rate-vertical/.

[121] "Amazon Prime retention rates in the United States between 1st quarter 2016 and 1st quarter 2023," *Statista.com*, https://www.statista.com/statistics/1251860/amazon-prime-retention-rates/.

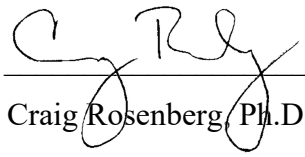
on data-driven UX tests and optimizing the UX for the majority of customers. The company's success is evidence that they are accomplishing this.

5.0 Conclusion

121. The findings of this report underscore the complexities of evaluating user interface (UI) practices in the context of the FTC's allegations against Amazon. While the term "dark patterns" is widely discussed, it remains poorly defined and inconsistently applied. This lack of clarity introduces subjectivity into regulatory assessments and risks conflating legitimate business practices with unethical behavior.

122. Amazon's user interface design adheres to industry norms and reflects a commitment to balancing clarity, efficiency, and user engagement through iterative improvements. Amazon's extensive efforts, such as Project Lucent and other A/B testing initiatives, demonstrate a proactive approach to addressing customer feedback and improving clarity in the Prime enrollment process. However, objective data from these efforts reveals that clarity-focused changes often yield mixed or unintended outcomes, suggesting that multiple factors beyond interface design influence user behavior. This highlights the challenges of relying on subjective evaluations to assess clarity or to attribute specific outcomes to alleged "dark patterns."

123. The FTC's claims lack sufficient empirical support and overly rely on anecdotal evidence, failing to account for the diversity and complexity of Amazon's global customer base. Without well-defined and measurable criteria for evaluating user interface concerns, regulatory actions may struggle to align with the realities of design practices, potentially leading to inconsistent and less effective outcomes. Amazon's success as a leader in e-commerce and its high customer retention rates underscore the effectiveness of its user-centric, data-driven approach to design, which prioritizes both business and customer needs.

Name: 

Craig Rosenberg, Ph.D.

Date: February 24, 2025

Appendix A: CV of Craig Rosenberg, Ph.D.

Craig S. Rosenberg, Ph.D.

An accomplished human factors engineer, user interface designer, project manager, and systems and software engineer specializing in analyzing and designing mobile computing devices, complex systems, user-centered design, information architecture, user experience, systems and software engineering, object-oriented analysis, and modeling and simulation. Extensive experience in the entire software design, development, and project management life cycle applied to a wide range of domains, from embedded mobile devices to enterprise-class mission-critical applications.

craig@globaltechnica.com
206-451-0706

SUMMARY OF QUALIFICATIONS

*** Human Factors, User Interface Design, Information Architecture, Cognitive Engineering, Experimental Design
*** Systems Engineering, Software Architecture, Modeling and Simulation, Virtual Environments, Animation, Art
*** C, C++, C#, Objective C, JAVA, UML, .NET, VISUAL BASIC, HTML, XML, PYTHON, LISP, FORTRAN, SAS
*** Visual Studio, Eclipse, Rhapsody, RSA/RSM, ClearCase, ClearQuest, Dreamweaver, Photoshop
*** Unity 3D, 3D Studio, Alias, AutoCAD, Rogue Wave, GD Pro, Motif, Builder Accessory, MS Office
*** Windows, Linux, OSX, PC, Macintosh, Sun, HP, IBM, StereoGraphics
*** Scholarship from the Interservice/Industry Training Simulation & Education Conference
*** Founder of the Northwest Alias Users Group
*** US Secret Security Clearance - expired

EDUCATION

Ph.D. Human Factors, University of Washington, 1994
M.S. Human Factors, University of Washington, 1990
B.S. Industrial Engineering, University of Washington, 1988
Graduating GPA: **3.83**

PROFESSIONAL EXPERIENCE

Global Technica, Seattle, WA — Nov 1994 - Present

CEO of an advanced engineering consulting and software development company providing systems design, development, and project management in the areas of custom software development, human factors engineering, user interface design, and simulation for a wide range of advanced commercial and military programs.

- Designed and developed advanced discrete event and agent-based software tools, models, and simulations in the areas of missile defense, homeland security, battle command management, networking and communications, mobile computing, air traffic control, software simulation, and UAV command and control.
- Designed and developed advanced air traffic control analysis applications, toolsets, and trade study simulations for Boeing Air Traffic Management. Technical lead responsible for tasking of twelve engineers.
- Designed and Developed the Boeing Human Agent Model; an advanced model for the simulation of human sensory, cognitive, and motor performance as applied to the roles of air traffic controllers, pilots, and UAV operators.
- Provided human factors engineering and user interface design for Boeing's main internal vector and raster computer aided drafting and editing system that produces all maintenance manuals, shop floor illustrations, and service bulletins for all Boeing commercial aircraft.
- Designed and developed multiple systems for the Future Combat Systems Network Systems and Software Engineering group.
- Designed and developed a system for Disney for simulating and tracking visitors at Disney World
- Designed and developed iOS and Android software for Immersion Networks

Additional responsibilities include project management, subcontractor management, outsourcing, system engineering, requirements analysis, functional specification, use case development, user stories, application prototyping, modeling and simulation, object-oriented software architecture, graphical user interface analysis and design, as well as UML, C++, C#, and Java software development.

StratoScientific, Seattle, WA — Jan 2014 - Present

Cofounder of a medical technology startup company creating an innovative case for smartphones that turns it into a digital stethoscope for enhanced diagnosis, serial comparisons, and telemedicine. Responsible for software project management.

Healium, Seattle, WA May 2013 – July 2016
Cofounder of a medical technology startup company leveraging wearable technologies such as Google Glass and Apple Watch to allow physicians to interact more easily with their electronic medical records. Responsible for software project management.

WhereWuz, Seattle, WA March 2010 – Jan 2014
Founder, inventor, user interface designer, and software architect for a company producing advanced mobile software running on GPS enabled smartphones. WhereWuz allows users to record exactly where they have been and query this data in unique ways for subsequent retrieval based on time or location. Currently available for iPhones and Android handheld devices. www.wherewuz.com

Entrepreneur in Residence, Spyglass Ventures, Los Angeles, CA April 2008 – Dec 2009
Lead technologist and entrepreneur in residence for a Los Angeles-based media-oriented venture capital firm focusing on early-stage private equity investing. Responsibilities include evaluating investment opportunities, generating new business ideas, and providing functional expertise to assist existing investments in the mobile and entertainment sectors.

User Interface Designer, ObjectSpeed, Seattle, WA Feb 2006 – June 2007
Lead user interface and interaction designer for a technology company specializing in consumer hand-held VoIP products. Responsible for all user interface design, user interaction, information architecture design, industrial design and human factors activities. Additional responsibilities include functional specification, human factors analysis, requirements analysis, application prototyping, graphical design, and user interface programming for a hand-held VoIP mobile consumer device.

User Interface Designer, Ahaza Systems, Seattle, WA June 2001 - Dec 2001
Lead user interface and interaction designer responsible for all user interface design and development activities associated with a complete line of advanced IPv6 network hardware devices. Duties include user interface design, human factors analysis, and interactive application prototyping.

User Interface Designer, Eyematic Interfaces, Seattle, WA Oct 99 - April 2001
Lead human factors and interaction designer responsible for all user interface design and development activities associated with real-time mobile hand-held 3D facial tracking, animation, avatar creation, and editing software. Duties include requirements analysis, functional specification, user interface design, and human factors analysis.

User Interface Designer, AT&T / Teague Corporation, Redmond, WA June 95 - March 96
Lead human factors and interaction designer for a large industrial design firm. Responsible for all functionality, human factors analysis, user interface design, graphical design, systems analysis, and documentation for the world's first two-way wireless pager produced by AT&T Wireless.

Associate Assistant Professor, University of Washington, Seattle, WA Dec 94 - Dec 95
Human Factors Professor at the University of Washington Industrial Engineering Department. Duties include teaching, writing research proposals, designing and conducting funded human factors experiments for the National Science Foundation, and hiring and supervising students.

Software Design Engineer, Socha Computing, Bellevue, WA Aug 94 - Sept 95
Responsible for designing and developing interactive multimedia games and educational software for children and adults. Duties include functional specification, software design and architecture, user interface design, application prototyping, software development, focus group testing, and internet research.

Network Engineer, PSF Industries, Seattle, WA March 92 - Nov 96
Independent consultant to a mechanical engineering firm specializing in designing, fabricating, and installing large-scale, high-pressure vessels. Responsible for designing, procuring, and installing an advanced networked computer-aided engineering system to improve design quality and engineer productivity.

Human Factors Researcher, University of Washington, Seattle, WA Jan 89 - June 94
Responsible for designing and performing advanced human factors experiments relating to virtual worlds and advanced visualization research. Funded by the National Science Foundation to conduct research on advanced software and hardware interfaces for virtual environments. Duties include user interface design, systems design, software development, graphics programming, experimental design, and hardware and software interfacing.

Alias Animator, Technology Design, Bellevue, WA April 91 - Jan 92
Independent contractor to an industrial design firm specializing in technology hardware design for computers and consumer electronics products. Created models, animations, and renderings that were used for product engineering and marketing. Services also included training, hardware and software installation, and system optimization.

Operations Manager, Micro Products, Bellevue, WA June 88 - Sept 88
Managed large-scale computer graphics conversion contracts. Installed and optimized a custom optical scanning and capture system for a computer graphics scanning company. Responsibilities included employee management, production scheduling, subcontracting and outsourcing, and software development.

Industrial Engineering Consultant, Avtech Corporation, Seattle, WA Jan 88 - June 88
Professional industrial engineer for a large aerospace digital electronics company. Solely responsible for completely redesigning the entire manufacturing facility to optimize the assembly of multiple lines of digital avionics communication equipment. Additional responsibilities included integrating software for a CNC milling center to automate the production of lighted instrument completely displays panels.

ADDITIONAL INFORMATION

I have published over twenty research papers in professional journals and proceedings relating to user interface design, computer graphics, and spatial, stereographic, and auditory display design. I was the sole recipient of a $10,000 scholarship award from the I/ITSEC for advancing the field of interactive computer graphics for flight simulation. I received an award from the Link Foundation for my work furthering the field of virtual interface design. I created five book covers for books by Harcourt Brace Publishing that feature the authors Arthur C. Clarke, Isaac Asimov, and Stephen King. Several minutes of my computer graphics animations appear in the movie Beyond the Mind's Eye, produced by MIRAMAR. I have won an engineering design award from the City of Los Angeles for designing an energy-saving product. I enjoy playing tennis, skiing, and composing, playing, and recording music in my free time. You can view my company's website at: www.globaltechnica.com

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Note: In addition to the documents on this list, I relied on all documents cited in my report to form my opinions.